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2 **CLAIMS:**
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4 1. An earth-boring bit, comprising:

5 a bit body;

6 a cantilevered bearing pin depending from the bit body;

7 a cone mounted for rotation on the bearing pin; and

8 a bearing surface between the cone and the bearing pin, the bearing surface having a DLC
9 coating formed thereon.

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11 2. The bit according to claim 1, wherein the DLC coating has a thickness in the range from 1 to
12 10 micrometers.

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14 3. The bit according to claim 1, wherein the DLC coating has a thickness in the range from 2 to
15 5 micrometers.

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17 4. The bit according to claim 1, wherein the DLC coating has a thickness in the range from 2 to
18 3 micrometers.

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20 5. The bit according to claim 1, wherein the DLC coating has a Knoop Scale hardness in the
21 range from 2000 to 5000.

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23 6. The bit according to claim 1, wherein the DLC coating is of carbon with a mixture of sp³ and
24 sp² bonds between atoms of the carbon.

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2 7. The bit according to claim 1, wherein the DLC coating is formed of amorphous and
3 hydrogenated amorphous carbon.

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5 8. The bit according to claim 1, wherein the DLC coating is doped with an alloying element
6 from the group consisting essentially of silicon, boron and boron nitride and a refractory metallic
7 element from the group consisting essentially of tantalum, titanium, tungsten, niobium and
8 zirconium.

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10 9. The bit according to claim 1, further comprising a thrust washer located between a thrust
11 shoulder of the bearing pin and the cone, the bearing surface containing the DLC coating being
12 on at least one side of the thrust washer.

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14 10. The bit according to claim 1, further comprising a sleeve located between the bearing pin
15 and the cone, the bearing surface containing the DLC coating being on at least one side of the
16 sleeve.

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18 11. The bit according to claim 1, further comprising a thrust washer located between a thrust
19 shoulder formed on the bearing pin and the cone, and a sleeve located between the bearing pin
20 and the cone, the bearing surface containing the DLC coating being on at least one side of the
21 thrust washer and on at least one side of the sleeve.

12. The bit according to claim 1, wherein the bearing surface having the DLC coating is formed on a journal surface of the bearing pin.

13. The bit according to claim 1, wherein the bearing surface having the DLC coating is formed within a cavity of the cone.

14. An earth-boring bit, comprising:

a bit body;

a cantilevered bearing pin depending from the bit body, the bearing pin having a thrust shoulder that is in a plane perpendicular to the axis of the bearing pin;

a cone mounted for rotation on the bearing pin, the cone having a thrust shoulder facing toward the thrust shoulder of the bearing pin; and

a thrust washer located between and in engagement with the thrust shoulders of the bearing pin and the cone, the thrust washer having a DLC coating formed thereon on at least one side.

15. The bit according to claim 14, wherein the DLC coating is formed on both sides of the thrust washer.

16. The bit according to claim 14, wherein the thrust shoulder of the bearing pin contains an inlay of a hard wear resistant material.

1 17. The bit according to claim 14, wherein the thrust shoulder of the bearing pin has a DLC
2 coating formed thereon.

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4 18. The bit according to claim 14, wherein the coating is of carbon with a mixture of sp³ and sp²
5 bonds between atoms of the carbon.

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7 19. The bit according to claim 14, wherein the coating is formed of amorphous and
8 hydrogenated amorphous carbon.

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10 20. The bit according to claim 14, wherein the DLC coating is doped with an alloying element
11 from the group consisting essentially of silicon, boron and boron nitride and a refractory metallic
12 element from the group consisting essentially of tantalum, titanium, tungsten, niobium and
13 zirconium.

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15 21. An earth-boring bit, comprising:

16 a bit body;

17 a cantilevered bearing pin depending from the bit body;

18 a cone mounted for rotation on the bearing pin; and

19 a sleeve located between the bearing pin and a cavity in the cone and having a DLC
20 coating formed thereon that is on at least one side.

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22 22. The bit according to claim 21, wherein the DLC coating is on both sides of the sleeve.

- 1 23. The bit according to claim 21, wherein the bearing pin also contains a DLC coating.
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- 3 24. The bit according to claim 21, wherein the cavity of the cone also contains a *DLC* coating.
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